WHAT IS CLAIMED IS:

1. A method for producing a fine carbon fiber comprising thermally decomposing a carbon material in the presence of a catalyst fluid containing a solvent and fine particles of a catalyst dispersed therein, wherein the fine particles have a size of 20 nm or less, and the catalyst comprises a transition metallic compound comprising at least one element selected from the group consisting of Fe, Ni, and Co.

2. The method according to claim 1, wherein the fine particles are dispersed in an organic dispersant by a dispersant or a surfactant, and the transition metal compound is dispersed in an amount of 0.003 to 5 mass %.

3. The method according to claim 2, wherein the surfactant is a cationic or anionic surfactant.

4. The method according to claim 1, wherein a sulfur compound is employed as a promoter in an amount of 0.01 to 10 mass %.

5. The method according to claim 1, wherein the transition metal compound is dispersed in a carbon material serving as a carbon source, and the resultant mixture is sprayed in the form of a liquid into a reaction furnace by use of a carrier gas.

6. The method according to claim 1, wherein the catalyst particles have a particle size of 200 nm or less.

7. The method according to claim 1, wherein the catalyst fine particles are $Fe_3O_4$ fine particles prepared in a reversed micelle containing water/bis(2-ethylhexyl) sulfosuccinate sodium salt (AOT)/benzene.